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CENTRAL INTELLIGENCE AGENCY

INFORMATION FROM FOREIGN DOCUMENTS OR RADIO BROADCASTS

REPORT

CD NO.

50X1-HUM

COUNTRY	USSR	DATE OF INFORMATION	1949
SUBJECT	Scientific - Welding equipment		
HOW PUBLISHED	Monthly periodical	DATE DIST.	31 May 1950
WHERE PUBLISHED	Moscow	NO. OF PAGES	2
DATE PUBLISHED	Nov 1949		
LANGUAGE	Russian	SUPPLEMENT TO REPORT NO.	

THIS IS UNEVALUATED INFORMATION

SOURCE Vestnik Elektropromyshlennosti, No 11, 1949.

THE NEW-TYPE MTM-50-75-U SPOT-WELDING MACHINES

Engr B. I. Kalinkin
Electric Welding Machine Plant
Ministry of Electrical Industry

[A digest]

The normal stationary machines produced for spot welding comprise a large group of pedal spot-welding units of various power, and spot-welding machines with pneumatic operation and timing control, such as Types MTP-75 and MTMP-75. The machines of the first group, with foot-pedal operation, have an output of about 450 to 600 spot welds per hour, which at present cannot satisfy the demands of industry. Machines of the second group, which have far higher output and a number of other advantages, cost several times as much and have a complex electrokinematic scheme.

An electric welding machine plant of the Ministry of the Electrical Industry has begun series production of modernized Type MTM-50-75-U spot welding machines, with motor drive, capable of welding speeds of up to 3,000 spot welds per hour. These spot welding machines are best suited for automatic operation in the welding of parts of one type. However, the design of the machines makes nonautomatic work possible simply by a slight adjustment taking one to 2 minutes. This enables the range of thickness of the welded material to be considerably increased. During nonautomatic work, the time of welding current flow and the time during which the welded parts are kept under pressure can be altered as desired.

The main advantages of the MTM-50-75-U machines are simplicity of design and maintenance, high productivity, and good welding quality with simple preparation of the work.

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The housing of the machines includes a single-phase transformer (Type KTE-134-10 in 50 kilovolt-amperes machines, or KTE-213 for 75) whose secondary consists of water-cooled hollow conductors. Taps on the primary provide the usual control over secondary voltage (MTM-50-U, 6 steps from 2.9 to 5.0 volts; MTM-75-U, 8 steps from 3.5 -7.0 volts).

The flow of the welding current is regulated by a cam-plate arrangement in which separate plates can be spread out to cover a wide arc (0.52 seconds maximum current flow) or brought together (0.12 seconds flow).

The preliminary and welding compression is obtained by a lever and spring mechanism and an eccentric cam driven by the electric motor through reduction gears. Pressure applied to a foot pedal releases the cam mechanism and causes the work to be compressed between the electrodes. In automatic work, keeping the pedal depressed produces a series of separate spot welds. The desired time lag is achieved by an additional lever mechanism which stops the cams in the extreme lower position of the top electrode.

By means of these devices and the control pedal, it is possible to ensure the desired conditions and to select a pressure curve corresponding to the particular case of welding. The contact pressure on the electrodes is regulated by adjusting a nut which creates the preliminary pull on the main spring. A divided scale on the spring permits checking the pressure and facilitates selection of proper operating conditions.

The Type MTM-50-75-U machines can be installed on a concrete foundation or on wooden blocks. Since the machine is water-cooled, water must be supplied from a pipe line. Each time before beginning work, the cooling system should be carefully checked to assure normal thermal conditions which are extremely important to proper operation. A drainage system is also necessary, and in addition, the machine should be grounded.

The ohmic resistance of the secondary circuit should be systematically checked under operational conditions. Before starting work, it should be within 50-75 microhms.

The technical data for Type MTM-50-U and Type MTM-75-U machines, respectively, is as follows: primary voltage, 220,380,500 volts in each case; continuous rating, 17.7 and 26.4 kilovolt-amperes; 12.5 percent repeated short-time duty, 50 and 75 kilovolt-amperes; automatic operation, 4 and 6 millimeters maximum material thickness at 3,000 spot welds per hour; nonautomatic, 12 and 16 millimeters thickness, and 240-450 and 180-380 spot welds per hour; useful overhang of electrodes, 300 millimeters, water consumption, 400 and 500 liters per second [sic]; working travel of electrodes, 40 millimeters; opening of electrodes, 150 millimeters; current, 10,000 and 12,000 amperes; maximum pressure, 250 and 350 kilograms; motor type, I-10/40 (0.25 kilovolt-amperes, 1,440 rpm); dimensions (depth, width, and height in millimeters) 955 x 655 x 1290 and 1,075 x 655 x 1,290; weight, 400 and 480 kilograms.

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